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ATGAAATTTA GTAAAAAATA TATAGCAGCT GGATCAGCTG TTATCGTATC CTTGAGTCTA    60
TGTGCCTATG CACTAAACCA GCATCGTTCG CAGGAAAATA AGGACAATAA TCGTGTCTCT   120
TATGTGGATG GCAGCCAGTC AAGTCAGAAA AGTGAAAACT TGACACCAGA CCAGGTTAGC   180
CAGAAAGAAG GAATTCAGGC TGAGCAAATT GTAATCAAAA TTACAGATCA GGGCTATGTA   240
ACGTCACACG GTGACCACTA TCATTACTAT AATGGGAAAG TTCCTTATGA TGCCCTCTTT   300
AGTGAAGAAC TCTTGATGAA GGATCCAAAC TATCAACTTA AGACGCTGA TATTGTCAAT    360
GAAGTCAAGG GTGGTTATAT CATCAAGGTC GATGGAAAAT ATTATGTCTA CCTGAAAGAT   420
GCAGCTCATG CTGATAATGT TCGAACTAAA GATGAAATCA ATCGTCAAAA ACAAGAACAT   480
GTCAAAGATA ATGAGAAGGT TAACTCTAAT GTTGCTGTAG CAAGGTCTCA GGGACGATAT   540
ACGACAAATG ATGGTTATGT CTTTAATCCA GCTGATATTA TCGAAGATAC GGGTAATGCT   600
TATATCGTTC CTCATGGAGG TCACTATCAC TACATTCCCA AAAGCGATTT ATCTGCTAGT   660
GAATTAGCAG CAGCTAAAGC ACATCTGGCT GGAAAAAATA TGCAACCGAG TCAGTTAAGC   720
TATTCTTCAA CAGCTAGTGA CAATAACACG CAATCTGTAG CAAAAGGATC AACTAGCAAG   780
CCAGCAAATA AATCTGAAAA TCTCCAGAGT CTTTTGAAGG AACTCTATGA TTCACCTAGC   840
GCCCAACGTT ACAGTGAATC AGATGGCCTG GTCTTTGACC CTGCTAAGAT TATCAGTCGT   900
ACACCAAATG GAGTTGCGAT TCCGCATGGC GACCATTACC ACTTTATTCC TTACAGCAAG   960
CTTTCTGCTT TAGAAGAAAA GATTGCCAGA ATGGTGCCTA TCAGTGGAAC TGGTTCTACA  1020
GTTTCTACAA ATGCAAAACC TAATGAAGTA GTGTCTAGTC TAGGCAGTCT TTCAAGCAAT  1080
CCTTCTTCTT TAACGACAAG TAAGGAGCTC TCTTCAGCAT CTGATGGTTA TATTTTTAAT  1140
CCAAAAGATA TCGTTGAAGA AACGGCTACA GCTTATATTG TAAGACATGG TGATCATTTC  1200
CATTACATTC CAAAATCAAA TCAAATTGGG CAACCGACTC TTCCAAACAA TAGTCTAGCA  1260
ACACCTTCTC CATCTCTTCC AATCAATCCA GGAACTTCAC ATGAGAAACA TGAAGAAGAT  1320
GGATACGGAT TTGATGCTAA TCGTATTATC GCTGAAGATG AATCAGGTTT TGTCATGAGT  1380
CACGGAGACC ACAATCATTA TTTCTTCAAG AAGGACTTGA CAGAAGAGCA AATTAAGGCT  1440
GCGCAAAAAC ATTTAGAGGA AGTTAAAACT AGTCATAATG GATTAGATTC TTTGTCATCT  1500
CATGAACAGG ATTATCCAGG TAATGCCAAA GAAATGAAAG ATTTAGATAA AAAAATCGAA  1560
GAAAAAATTG CTGGCATTAT GAAACAATAT GGTGTCAAAC GTGAAAGTAT TGTCGTGAAT  1620
AAAGAAAAAA ATGCGATTAT TTATCCGCAT GGAGATCACC ATCATGCAGA TCCGATTGAT  1680
GAACATAAAC CGGTTGGAAT TGGTCATTCT CACAGTAACT ATGAACTGTT TAAACCCGAA  1740
GAAGGAGTTG CTAAAAAAGA AGGGAATAAA GTTTATACTG GAGAAGAATT AACGAATGTT  1800
GTTAATTTGT TAAAAAATAG TACGTTTAAT AATCAAAACT TTACTCTAGC CAATGGTCAA  1860
AAACGCGTTT CTTTTAGTTT TCCGCCTGAA TTGGAGAAAA AATTAGGTAT CAATATGCTA  1920
GTAAAATTAA TAACACCAGA TGGAAAAGTA TTGGAGAAAG TATCTGGTAA AGTATTTGGA  1980
GAAGGAGTAG GGAATATTGC AAACTTTGAA TTAGATCAAC CTTATTTACC AGGACAAACA  2040
TTTAAGTATA CTATCGCTTC AAAAGATTAT CCAGAAGTAA GTTATGATGG TACATTTACA  2100
GTTCCAACCT CTTTAGCTTA CAAAATGGCC AGTCAAACGA TTTTCTATCC TTTCCATGCA  2160
GGGGATACTT ATTTAAGAGT GAACCCTCAA TTTGCAGTGC CTAAAGGAAC TGATGCTTTA  2220
GTCAGAGTGT TTGATGAATT TCATGGAAAT GCTTATTTAG AAAATAACTA TAAAGTTGGT  2280
GAAATCAAAT ACCGATTCC GAAATTAAAC CAAGGAACAA CCAGAACGGC CGGAAATAAA   2340
ATTCCTGTAA CCTTCATGGC AAATGCTTAT TTGGACAATC AATCGACTTA TATTGTGGAA  2400
GTACCTATCT TGGAAAAAGA AAATCAAACT GATAAACCAA GTATTCTACC ACAATTTAAA  2460
AGGAATAAAG CACAAGAAAA CTCAAAACTT GATGAAAAGG TAGAAGAACC AAAGACTAGT  2520
GAGAAGGTAG AAAAAGAAAA ACTTTCTGAA ACTGGAATA GTACTAGTAA TTCAACGTTA   2580
GAAGAAGTTC CTACAGTGGA TCCTGTACAA GAAAAAGTAG CAAAATTTGC TGAAAGTTAT  2640
GGGATGAAGC TAGAAAATGT CTTGTTTAAT ATGGACGGAA CAATTGAATT ATATTTACCA  2700
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TCAGGAGAAG TCATTAAAAA GAATATGGCA GATTTTACAG GAGAAGCACC TCAAGGAAAT    2760
GGTGAAAATA AACCATCTGA AAATGGAAAA GTATCTACTG GAACAGTTGA GAACCAACCA    2820
ACAGAAAATA AACCAGCAGA TTCTTTACCA GAGGCACCAA ACGAAAAACC TGTAAAACCA    2880
GAAAACTCAA CGGATAATGG AATGTTGAAT CCAGAAGGGA ATGTGGGGAG TGACCCTATG    2940
TTAGATCCAG CATTAGAGGA AGCTCCAGCA GTAGATCCTG TACAAGAAAA ATTAGAAAAA    3000
TTTACAGCTA GTTACGGATT AGGCTTAGAT AGTGTTATAT TCAATATGGA TGGAACGATT    3060
GAATTAAGAT TGCCAAGTGG AGAAGTGATA AAAAAGAATT TATCTGATTT CATAGCGTAA    3120
(SEQ ID NO: 1)
FIGURE 1
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AATTCCTTGT CGGGTAAGTT CCGACCCGCA CGAAAGGCGT AATGATTTGG GCACTGTCTC      60
AACGAGAGAC TCGGTGAAAT TTTAGTACCT GTGAAGATGC AGGTTACCCG CGACAGGACG     120
GAAAGACCCC ATGGAGCTTT ACTGCAGTTT GATATTGAGT GTCTGTACCA CATGTACAGG     180
ATAGGTAGGA GTCTAAGAGA TCGGGACGCC AGTTTCGAAG GAGACGCTGT TGGGATACTA     240
CCCTTGTGTT ATGGCCACTC TAACCCAGAT AGGTGATCCC TATCGGAGAC AGTGTCTGAC     300
GGGCAGTTTG ACTGGGGCGG TCGCCTCCTA AAAGGTAACG GAGGCGCCCA AAGGTTCCCT     360
CAGAATGGTT GGAAATCATT CGCAGAGTGT AAAGGTATAA GGGAGCTTGA CTGCGAGAGC     420
TACAACTCGA GCAGGACGA AGTCGGGCT TAGTGATCCG GTGGTTCCGT ATGGAAGGGC     480
CATCGCTCAA CGGATAAAAG CTACCCTGGG GATAACAGGC TTATCTCCCC CAAGAGTTCA     540
CATCGACGGG GAGGTTTGGC ACCTCGATGT CGGCTCGTCG CATCCTGGGG CTGTAGTCGG     600
TCCCAAGGGT TGGGCTGTTC GCCCATTAAA GCGGCACGCG AGCTGGGTTC AGAACGTCGT     660
GAGACAGTTC GGTCCCTATC CGTCGCGGGC GTAGGAAATT TGAGAGGATC TGCTCCTAGT     720
ACGAGAGGAC CAGAGTGGAC TTACCGCTGG TGTACCAGTT GTCTTGCCAA AGGCATCGCT     780
GGGTAGCTAT GTAGGGAAGG GATAAACGCT GAAAGCATCT AAGTGTGAAA CCCACCTCAA     840
GATGAGATTT CCCATGATTA TATATCAGTA AGAGCCCTGA GAGATGATCA GGTAGATAGG     900
TTAGAAGTGG AAGTGTGGCG ACACATGTAG CGGACTAATA CTAATAGCTC GAGGACTTAT     960
CCAAAGTAAC TGAGAATATG AAAGCGAACG GTTTTCTTAA ATTGAATAGA TATTCAATTT    1020
TGAGTAGGTA TTACTCAGAG TTAAGTGACG ATAGCCTAGG AGATACACCT GTACCCATGC    1080
CGAACACAGA AGTTAAGCCC TAGAACGCCG GAAGTAGTTG GGGGTTGCCC CCTGTGAGAT    1140
AGGGAAGTCG CTTAGCTCTA GGGAGTTTAG CTCAGCTGGG AGAGCATCTG CCTTACAAGC    1200
AGAGGGTCAG CGGTTCGATC CCGTTAACTC CCAAAGGTCC CGTAGTGTAG CGGTTATCAC    1260
GTCGCCCTGT CACGGCGAAG ATCGCGGGTT CGATTCCCGT CGGGACCGTT TAAGGTAACG    1320
CAAGTTATTT TAGACTCGTT AGCTCAGTTG GTAGAGCAAT TGACTTTTAA TCAATGGGTC    1380
ACTGGTTCGA GCCCAGTACG GGTCATATAT GCGGGTTTGG CGGAATTCTA ATCTCTTTGA    1440
AATCATCTTC TCTCACTTTC CAAAACTCTA TTACCTCTTA TTATACCACA TTTCAATCTT    1500
CAACTTCCCA GTAATATAAG CACCTCTGGC GAAAGAAGTT TCAATGTCCT AAAGTAATAA    1560
GTGAATCCAA TTCAGGAACT CCAAGAACAA AAGAAACATC TGGTGTCACA AGTATTGGAT    1620
GGCACAGAGT CACGTGGTAG TCTGACCCTA GCAGAAATTT AAAATAGTAA ACTATTTACT    1680
GGTTAATTAA ATGGTTAAAT AACCGGTTTA GAAAACTATT TAATAAAGTA AAAGAAGTTG    1740
AGAAAAAACT TCATCATTTA TTGAAATGAG GGATTTATGA AATTTAGTAA AAAATATATA    1800
GCAGCTGGAT CAGCTGTTAT CGTATCCTTG AGTCTATGTG CCTATGCACT AAACCAGCAT    1860
CGTTCGCAGG AAAATAAGGA CAATAATCGT GTCTCTTATG TGGATGGCAG CCAGTCAAGT    1920
CAGAAAAGTG AAAACTTGAC ACCAGACCAG GTTAGCCAGA AGAAGGAAT TCAGGCTGAG    1980
CAAATTGTAA TCAAAATTAC AGATCAGGGC TATGTAACGT CACACGGTGA CCACTATCAT    2040
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TACTATAATG GGAAAGTTCC TTATGATGCC CTCTTTAGTG AAGAACTCTT GATGAAGGAT    2100
CCAAACTATC AACTTAAAGA CGCTGATATT GTCAATGAAG TCAAGGGTGG TTATATCATC    2160
AAGGTCGATG GAAAATATTA TGTCTACCTG AAAGATGCAG CTCATGCTGA TAATGTTCGA    2220
ACTAAAGATG AAATCAATCG TCAAAAACAA GAACATGTCA AAGATAATGA GAAGGTTAAC    2280
TCTAATGTTG CTGTAGCAAG GTCTCAGGGA CGATATACGA CAAATGATGG TTATGTCTTT    2340
AATCCAGCTG ATATTATCGA AGATACGGGT AATGCTTATA TCGTTCCTCA TGGAGGTCAC    2400
TATCACTACA TTCCCAAAAG CGATTTATCT GCTAGTGAAT TAGCAGCAGC TAAAGCACAT    2460
CTGGCTGGAA AAAATATGCA ACCGAGTCAG TTAAGCTATT CTTCAACAGC TAGTGACAAT    2520
AACACGCAAT CTGTAGCAAA AGGATCAACT AGCAAGCCAG CAAATAAATC TGAAAATCTC    2580
CAGAGTCTTT TGAAGGAACT CTATGATTCA CCTAGCGCCC AACGTTACAG TGAATCAGAT    2640
GGCCTGGTCT TTGACCCTGC TAAGATTATC AGTCGTACAC CAAATGGAGT TGCGATTCCG    2700
CATGGCGACC ATTACCACTT TATTCCTTAC AGCAAGCTTT CTGCTTTAGA AGAAAAGATT    2760
GCCAGAATGG TGCCTATCAG TGGAACTGGT TCTACAGTTT CTACAAATGC AAAACCTAAT    2820
GAAGTAGTGT CTAGTCTAGG CAGTCTTTCA AGCAATCCTT CTTCTTTAAC GACAAGTAAG    2880
GAGCTCTCTT CAGCATCTGA TGGTTATATT TTTAATCCAA AAGATATCGT TGAAGAAACG    2940
GCTACAGCTT ATATTGTAAG ACATGGTGAT CATTTCCATT ACATTCCAAA ATCAAATCAA    3000
ATTGGGCAAC CGACTCTTCC AAACAATAGT CTAGCAACAC CTTCTCCATC TCTTCCAATC    3060
AATCCAGGAA CTTCACATGA GAAACATGAA GAAGATGGAT ACGGATTTGA TGCTAATCGT    3120
ATTATCGCTG AAGATGAATC AGGTTTTGTC ATGAGTCACG GAGACCACAA TCATTATTTC    3180
TTCAAGAAGG ACTTGACAGA AGAGCAAATT AAGGCTGCGC AAAAACATTT AGAGGAAGTT    3240
AAAACTAGTC ATAATGGATT AGATTCTTTG TCATCTCATG AACAGGATTA TCCAGGTAAT    3300
GCCAAAGAAA TGAAAGATTT AGATAAAAAA ATCGAAGAAA AAATTGCTGG CATTATGAAA    3360
CAATATGGTG TCAAACGTGA AAGTATTGTC GTGAATAAAG AAAAAAATGC GATTATTTAT    3420
CCGCATGGAG ATCACCATCA TGCAGATCCG ATTGATGAAC ATAAACCGGT TGGAATTGGT    3480
CATTCTCACA GTAACTATGA ACTGTTTAAA CCCGAAGAAG GAGTTGCTAA AAAAGAAGGG    3540
AATAAAGTTT ATACTGGAGA AGAATTAACG AATGTTGTTA ATTTGTTAAA AAATAGTACG    3600
TTTAATAATC AAAACTTTAC TCTAGCCAAT GGTCAAAAAC GCGTTTCTTT TAGTTTTCCG    3660
CCTGAATTGG AGAAAAAATT AGGTATCAAT ATGCTAGTAA AATTAATAAC ACCAGATGGA    3720
AAAGTATTGG AGAAAGTATC TGGTAAAGTA TTTGGAGAAG GAGTAGGGAA TATTGCAAAC    3780
TTTGAATTAG ATCAACCTTA TTTACCAGGA CAAACATTTA AGTATACTAT CGCTTCAAAA    3840
GATTATCCAG AAGTAAGTTA TGATGGTACA TTTACAGTTC CAACCTCTTT AGCTTACAAA    3900
ATGGCCAGTC AAACGATTTT CTATCCTTTC CATGCAGGGG ATACTTATTT AAGAGTGAAC    3960
CCTCAATTTG CAGTGCCTAA AGGAACTGAT GCTTTAGTCA GAGTGTTTGA TGAATTTCAT    4020
GGAAATGCTT ATTTAGAAAA TAACTATAAA GTTGGTGAAA TCAAATTACC GATTCCGAAA    4080
TTAAACCAAG GAACAACCAG AACGGCCGGA AATAAAATTC CTGTAACCTT CATGGCAAAT    4140
GCTTATTTGG ACAATCAATC GACTTATATT GTGGAAGTAC CTATCTTGGA AAAAGAAAAT    4200
CAAACTGATA AACCAAGTAT TCTACCACAA TTTAAAAGGA ATAAAGCACA AGAAAACTCA    4260
AAACTTGATG AAAAGGTAGA AGAACCAAAG ACTAGTGAGA AGGTAGAAAA AGAAAAACTT    4320
TCTGAAACTG GAATAGTAC TAGTAATTCA ACGTTAGAAG AAGTTCCTAC AGTGGATCCT    4380
GTACAAGAAA AAGTAGCAAA ATTTGCTGAA AGTTATGGGA TCAAGCTAGA AAATGTCTTG    4440
TTTAATATGG ACGGAACAAT TGAATTATAT TTACCATCAG GAGAAGTCAT TAAAAAGAAT    4500
ATGGCAGATT TTACAGGAGA AGCACCTCAA GGAAATGGTG AAAATAAACC ATCTGAAAAT    4560
GGAAAAGTAT CTACTGGAAC AGTTGAGAAC CAACCAACAG AAAATAAACC AGCAGATTCT    4620
TTACCAGAGG CACCAAACGA AAAACCTGTA AAACCAGAAA ACTCAACGGA TAATGGAATG    4680
TTGAATCCAG AAGGGAATGT GGGGAGTGAC CCTATGTTAG ATCCAGCATT AGAGGAAGCT    4740
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CCAGCAGTAG ATCCTGTACA AGAAAAATTA GAAAAATTTA CAGCTAGTTA CGGATTAGGC      4800
TTAGATAGTG TTATATTCAA TATGGATGGA ACGATTGAAT TAAGATTGCC AAGTGGAGAA      4860
GTGATAAAAA AGAATTTATC TGATTTCATA GCGTAAGGAA TAGCAGTAGA AAAAGTCTGA      4920
ATCAAAAATG AAGTTCTCTC AAAAGTTAGA AATAAAACTC TGACTTTGGG AGAATTTCAT      4980
TTTATTATTA ATATATAAAA TTTCTTGACA TACAACTTAA AAGAGGTGG AATATTTACT       5040
AGTTAATT     (SEQ ID NO : 2)                                           5048
FIGURE 2
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ATGAAAATCA ATAAAAAATA TCTAGCTGGG TCAGTAGCTA CACTTGTTTT AAGTGTCTGT      60
GCTTATGAAC TAGGTTTGCA TCAAGCTCAA ACTGTAAAAG AAAATAATCG TGTTTCCTAT      120
ATAGATGGAA AACAAGCGAC GCAAAAAACG GAGAATTTGA CTCCTGATGA GGTTAGCAAG      180
CGTGAAGGAA TCAACGCCGA ACAAATCGTC ATCAAGATTA CGGATCAAGG TTATGTGACC      240
TCTCATGGAG ACCATTATCA TTACTATAAT GGCAAGGTCC CTTATGATGC CATCATCAGT      300
GAAGAGCTCC TCATGAAAGA TCCGAATTAT CAGTTGAAGG ATTCAGACAT TGTCAATGAA      360
ATCAAGGGTG GTTATGTCAT TAAGGTAAAC GGTAAATACT ATGTTTACCT TAAGGATGCA      420
GCTCATGCGG ATAATGTCCG TACAAAAGAA GAAATCAATC GGCAAAAACA AGAACATAGT      480
CAGCATCGTG AAGGAGGGAC TTCAGCAAAC GATGGTGCGG TAGCCTTTGC ACGTTCACAG      540
GGACGCTACA CCACAGATGA TGGTTATATC TTCAATGCAT CTGATATCAT CGAAGATACG      600
GGCGATGCCT ATATCGTTCC TCATGGAGAT CATTACCATT ACATTCCTAA GAATGAGTTA      660
TCAGCTAGCG AGTTGGCTGC TGCAGAAGCC TTCCTATCTG GTCGGGAAAA TCTGTCAAAT      720
TTAAGAACCT ATCGCCGACA AAATAGCGAT AACACTCCAA GAACAAACTG GTACCTTCT      780
GTAAGCAATC CAGGAACTAC AAATACTAAC ACAAGCAACA ACAGCAACAC TAACAGTCAA      840
GCAAGTCAAA GTAATGACAT TGATAGTCTC TTGAAACAGC TCTACAAACT GCCTTTGAGT      900
CAACGCCATG TAGAATCTGA TGGCCTTATT TTCGACCCAG CGCAAATCAC AAGTCGAACC      960
GCCAGAGGTG TAGCTGTCCC TCATGGTAAC CATTACCACT TTATCCCTTA TGAACAAATG      1020
TCTGAATTGG AAAAACGAAT TGCTCGTATT ATTCCCCTTC GTTATCGTTC AAACCATTGG      1080
GTACCAGATT CAAGACCAGA AGAACCAAGT CCACAACCGA CTCCAGAACC TAGTCCAAGT      1140
CCGCAACCTG CACCAAATCC TCAACCAGCT CCAAGCAATC CAATTGATGA GAAATTGGTC      1200
AAAGAAGCTG TTCGAAAAGT AGGCGATGGT TATGTCTTTG AGGAGAATGG AGTTTCTCGT      1260
TATATCCCAG CCAAGAATCT TTCAGCAGAA ACAGCAGCAG GCATTGATAG CAAACTGGCC      1320
AAGCAGGAAA GTTTATCTCA TAAGCTAGGA GCTAAGAAAA CTGACCTCCC ATCTAGTGAT      1380
CGAGAATTTT ACAATAAGGC TTATGACTTA CTAGCAAGAA TTCACCAAGA TTTACTTGAT      1440
AATAAAGGTC GACAAGTTGA TTTTGAGGCT TTGGATAACC TGTTGGAACG ACTCAAGGAT      1500
GTCTCAAGTG ATAAAGTCAA GTTAGTGGAT GATATTCTTG CCTTCTTAGC TCCGATTCGT      1560
CATCCAGAAC GTTTAGGAAA ACCAAATGCG CAAATTACCT ACACTGATGA TGAGATTCAA      1620
GTAGCCAAGT TGGCAGGCAA GTACACAACA GAAGACGGTT ATATCTTTGA TCCTCGTGAT      1680
ATAACCAGTG ATGAGGGGGA TGCCTATGTA ACTCCACATA TGACCCATAG CCACTGGATT      1740
AAAAAAGATA GTTTGTCTGA AGCTGAGAGA GCGGCAGCCC AGGCTTATGC TAAAGAGAAA      1800
GGTTTGACCC CTCCTTCGAC AGACCATCAG GATTCAGGAA ATACTGAGGC AAAAGGAGCA      1860
GAAGCTATCT ACAACCGCGT GAAAGCAGCT AAGAAGGTGC CACTTGATCG TATGCCTTAC      1920
AATCTTCAAT ATACTGTAGA AGTCAAAAAC GGTAGTTTAA TCATACCTCA TTATGACCAT      1980
TACCATAACA TCAAATTTGA GTGGTTTGAC GAAGGCCTTT ATGAGGCACC TAAGGGGTAT      2040
ACTCTTGAGG ATCTTTTGGC GACTGTCAAG TACTATGTCG AACATCCAAA CGAACGTCCG      2100
CATTCAGATA ATGGTTTTGG TAACGCTAGC GACCATGTTC AAAGAAACAA AAATGGTCAA      2160
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GCTGATACCA ATCAAACGGA AAAACCAAGC GAGGAGAAAC CTCAGACAGA AAAACCTGAG      2220
GAAGAAACCC CTCGAGAAGA GAAACCACAA AGCGAGAAAC CAGAGTCTCC AAAACCAACA      2280
GAGGAACCAG AAGAAGAATC ACCAGAGGAA TCAGAAGAAC CTCAGGTCGA GACTGAAAAG      2340
GTTGAAGAAA AACTGAGAGA GGCTGAAGAT TTACTTGGAA AAATCCAGGA TCCAATTATC      2400
AAGTCCAATG CCAAAGAGAC TCTCACAGGA TTAAAAAATA ATTTACTATT TGGCACCCAG      2460
GACAACAATA CTATTATGGC AGAAGCTGAA AAACTATTGG CTTTATTAAA GGAGAGTAAG      2520
TAA    (SEQ ID NO: 3)                                                 2523
FIGURE 3
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CAGAGATCTT AGTGAATCAA ATATACTTAA GAAAAGAGGA AAGAATGAAA ATCAATAAAA        60
AATATCTAGC TGGGTCAGTA GCTACACTTG TTTTAAGTGT CTGTGCTTAT GAACTAGGTT       120
TGCATCAAGC TCAAACTGTA AAAGAAAATA ATCGTGTTTC CTATATAGAT GGAAAACAAG       180
CGACGCAAAA AACGGAGAAT TTGACTCCTG ATGAGGTTAG CAAGCGTGAA GGAATCAACG       240
CCGAACAAAT CGTCATCAAG ATTACGGATC AAGGTTATGT GACCTCTCAT GGAGACCATT       300
ATCATTACTA TAATGGCAAG GTCCCTTATG ATGCCATCAT CAGTGAAGAG CTCCTCATGA       360
AAGATCCGAA TTATCAGTTG AAGGATTCAG ACATTGTCAA TGAAATCAAG GGTGGTTATG       420
TCATTAAGGT AAACGGTAAA TACTATGTTT ACCTTAAGGA TGCAGCTCAT GCGGATAATG       480
TCCGTACAAA AGAAGAAATC AATCGGCAAA AACAAGAACA TAGTCAGCAT CGTGAAGGAG       540
GGACTTCAGC AAACGATGGT GCGGTAGCCT TTGCACGTTC ACAGGGACGC TACACCACAG       600
ATGATGGTTA TATCTTCAAT GCATCTGATA TCATCGAAGA TACGGGCGAT GCCTATATCG       660
TTCCTCATGG AGATCATTAC CATTACATTC CTAAGAATGA GTTATCAGCT AGCGAGTTGG       720
CTGCTGCAGA AGCCTTCCTA TCTGGTCGGG AAAATCTGTC AAATTTAAGA ACCTATCGCC       780
GACAAAATAG CGATAACACT CCAAGAACAA ACTGGGTACC TTCTGTAAGC AATCCAGGAA       840
CTACAAATAC TAACACAAGC AACAACAGCA ACACTAACAG TCAAGCAAGT CAAAGTAATG       900
ACATTGATAG TCTCTTGAAA CAGCTCTACA AACTGCCTTT GAGTCAACGC CATGTAGAAT       960
CTGATGGCCT TATTTTCGAC CCAGCGCAAA TCACAAGTCG AACCGCCAGA GGTGTAGCTG      1020
TCCCTCATGG TAACCATTAC CACTTTATCC CTTATGAACA AATGTCTGAA TTGGAAAAAC      1080
GAATTGCTCG TATTATTCCC CTTCGTTATC GTTCAAACCA TTGGGTACCA GATTCAAGAC      1140
CAGAAGAACC AAGTCCACAA CCGACTCCAG AACCTAGTCC AAGTCCGCAA CCTGCACCAA      1200
ATCCTCAACC AGCTCCAAGC AATCCAATTG ATGAGAAATT GGTCAAAGAA GCTGTTCGAA      1260
AAGTAGGCGA TGGTTATGTC TTTGAGGAGA ATGGAGTTTC TCGTTATATC CCAGCCAAGA      1320
ATCTTTCAGC AGAAACAGCA GCAGGCATTG ATAGCAAACT GGCCAAGCAG GAAAGTTTAT      1380
CTCATAAGCT AGGAGCTAAG AAAACTGACC TCCATCTAG TGATCGAGAA TTTTACAATA       1440
AGGCTTATGA CTTACTAGCA AGAATTCACC AAGATTTACT TGATAATAAA GGTCGACAAG      1500
TTGATTTTGA GGCTTTGGAT AACCTGTTGG AACGACTCAA GGATGTCTCA AGTGATAAAG      1560
TCAAGTTAGT GGATGATATT CTTGCCTTCT TAGCTCCGAT TCGTCATCCA GAACGTTTAG      1620
GAAAACCAAA TGCGCAAATT ACCTACACTG ATGATGAGAT TCAAGTAGCC AAGTTGGCAG      1680
GCAAGTACAC AACAGAAGAC GGTTATATCT TTGATCCTCG TGATATAACC AGTGATGAGG      1740
GGGATGCCTA TGTAACTCCA CATATGACCC ATAGCCACTG GATTAAAAAA GATAGTTTGT      1800
CTGAAGCTGA GAGAGCGGCA GCCCAGGCTT ATGCTAAAGA GAAAGGTTTG ACCCCTCCTT      1860
CGACAGACCA TCAGGATTCA GGAAATACTG AGGCAAAAGG AGCAGAAGCT ATCTACAACC      1920
GCGTGAAAGC AGCTAAGAAG GTGCCACTTG ATCGTATGCC TTACAATCTT CAATATACTG      1980
TAGAAGTCAA AAACGGTAGT TTAATCATAC CTCATTATGA CCATTACCAT AACATCAAAT      2040
TTGAGTGGTT TGACGAAGGC CTTTATGAGG CACCTAAGGG GTATACTCTT GAGGATCTTT      2100
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TGGCGACTGT CAAGTACTAT GTCGAACATC CAAACGAACG TCCGCATTCA GATAATGGTT    2160
TTGGTAACGC TAGCGACCAT GTTCAAAGAA ACAAAAATGG TCAAGCTGAT ACCAATCAAA    2220
CGGAAAAACC AAGCGAGGAG AAACCTCAGA CAGAAAAACC TGAGGAAGAA ACCCCTCGAG    2280
AAGAGAAACC ACAAAGCGAG AAACCAGAGT CTCCAAAACC AACAGAGGAA CCAGAAGAAG    2340
AATCACCAGA GGAATCAGAA GAACCTCAGG TCGAGACTGA AAAGGTTGAA GAAAAACTGA    2400
GAGAGGCTGA AGATTTACTT GGAAAAATCC AGGATCCAAT TATCAAGTCC AATGCCAAAG    2460
AGACTCTCAC AGGATTAAAA AATAATTTAC TATTTGGCAC CCAGGACAAC AATACTATTA    2520
TGGCAGAAGC TGAAAAACTA TTGGCTTTAT TAAAGGAGAG TAAGTAAAGG TAGCAGCATT    2580
TTCTAACTCC TAAAAACAGG ATAGGAGAAC GGGAAAACGA AAAATGAGAG CAGAATGTGA    2640
GTTCTAG    (SED ID NO : 4)                                           2647
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FIGURE 4

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GGGTCTTAAA ACTCTGAATC CTTTAGAGGC AGACCCACAA AATGACAAGA CCTATTTAGA     60
AAATCTGGAA GAAAATATGA GTGTTCTAGC AGAAGAATTA AAGTGAGGAA AGAATGAAAA    120
TCAATAAAAA ATATCTAGCA GGTTCAGTGG CAGTCCTTGC CCTAAGTGTT TGTTCCTATG    180
AACTTGGTCG TCACCAAGCT GGTCAGGTTA AGAAAGAGTC TAATCGAGTT TCTTATATAG    240
ATGGTGATCA GGCTGGTCAA AAGGCAGAAA ATTTGACACC AGATGAAGTC AGTAAGAGAG    300
AGGGGATCAA CGCCGAACAA ATTGTTATCA AGATTACGGA TCAAGGTTAT GTGACCTCTC    360
ATGGAGACCA TTATCATTAC TATAATGGCA AGGTTCCTTA TGATGCCATC ATCAGTGAAG    420
AACTTCTCAT GAAAGATCCG AATTATCAGT TGAAGGATTC AGACATTGTC AATGAAATCA    480
AGGGTGGCTA TGTGATTAAG GTAGACGGAA AATACTATGT TTACCTTAAA GATGCGGCCC    540
ATGCGGACAA TATTCGGACA AAAGAAGAGA TTAAACGTCA GAAGCAGGAA CACAGTCATA    600
ATCATAACTC AAGAGCAGAT AATGCTGTTG CTGCAGCCAG AGCCCAAGGA CGTTATACAA    660
CGGATGATGG GTATATCTTC AATGCATCTG ATATCATTGA GGACACGGGT GATGCTTATA    720
TCGTTCCTCA CGGCGACCAT TACCATTACA TTCCTAAGAA TGAGTTATCA GCTAGCGAGT    780
TAGCTGCTGC AGAAGCCTAT TGGAATGGGA AGCAGGGATC TCGTCCTTCT TCAAGTTCTA    840
GTTATAATGC AAATCCAGTT CAACCAAGAT TGTCAGAGAA CCACAATCTG ACTGTCACTC    900
CAACTTATCA TCAAAATCAA GGGGAAAACA TTTCAAGCCT TTTACGTGAA TTGTATGCTA    960
AACCCTTATC AGAACGCCAT GTAGAATCTG ATGGCCTTAT TTTCGACCCA GCGCAAATCA   1020
CAAGTCGAAC CGCCAGAGGT GTAGCTGTCC CTCATGGTAA CCATTACCAC TTTATCCCTT   1080
ATGAACAAAT GTCTGAATTG GAAAAACGAA TTGCTCGTAT TATTCCCCTT CGTTATCGTT   1140
CAAACCATTG GGTACCAGAT TCAAGACCAG AACAACCAAG TCCACAATCG ACTCCGGAAC   1200
CTAGTCCAAG TCTGCAACCT GCACCAAATC CTCAACCAGC TCCAAGCAAT CCAATTGATG   1260
AGAAATTGGT CAAAGAAGCT GTTCGAAAAG TAGGCGATGG TTATGTCTTT GAGGAGAATG   1320
GAGTTTCTCG TTATATCCCA GCCAAGGATC TTTCAGCAGA AACAGCAGCA GGCATTGATA   1380
GCAAACTGGC CAAGCAGGAA AGTTTATCTC ATAAGCTAGG AGCTAAGAAA ACTGACCTCC   1440
CATCTAGTGA TCGAGAATTT TACAATAAGG CTTATGACTT ACTAGCAAGA ATTCACCAAG   1500
ATTTACTTGA TAATAAAGGT CGACAAGTTG ATTTTGAGGT TTTGGATAAC CTGTTGGAAC   1560
GACTCAAGGA TGTCTCAAGT GATAAAGTCA AGTTAGTGGA TGATATTCTT GCCTTCTTAG   1620
CTCCGATTCG TCATCCAGAA CGTTTAGGAA AACCAAATGC GCAAATTACC TACACTGATG   1680
ATGAGATTCA AGTAGCCAAG TTGGCAGGCA AGTACACAAC AGAAGACGGT TATATCTTTG   1740
ATCCTCGTGA TATAACCAGT GATGAGGGGG ATGCCTATGT AACTCCACAT ATGACCCATA   1800
GCCACTGGAT TAAAAAAGAT AGTTTGTCTG AAGCTGACAG AGCGGCAGCC CAGGCTTATG   1860
CTAAAGAGAA AGGTTTGACC CCTCCTTCGA CAGACCACCA GGATTCAGGA AATACTGAGG   1920
```

```
CAAAAGGAGC AGAAGCTATC TACAACCGCG TGAAAGCAGC TAAGAAGGTG CCACTTGATC    1980
GTATGCCTTA CAATCTTCAA TATACTGTAG AAGTCAAAAA CGGTAGTTTA ATCATACCTC    2040
ATTATGACCA TTACCATAAC ATCAAATTTG AGTGGTTTGA CGAAGGCCTT TATGAGGCAC    2100
CTAAGGGGTA TAGTCTTGAG GATCTTTTGG CGACTGTCAA GTACTATGTC GAACATCCAA    2160
ACGAACGTCC GCATTCAGAT AATGGTTTTG GTAACGCTAG TGACCATGTT CGTAAAAATA    2220
AGGCAGACCA AGATAGTAAA CCTGATGAAG ATAAGGAACA TGATGAAGTA AGTGAGCCAA    2280
CTCACCCTGA ATCTGATGAA AAAGAGAATC ACGCTGGTTT AAATCCTTCA GCAGATAATC    2340
TTTATAAACC AAGCACTGAT ACGGAAGAGA CAGAGGAAGA AGCTGAAGAT ACCACAGATG    2400
AGGCTGAAAT TCCTCAAGTA GAGAATTCTG TTATTAACGC TAAGATAGCA GATGCGGAGG    2460
CCTTGCTAGA AAAAGTAACA GATCCTAGTA TTAGACAAAA TGCTATGGAG ACATTGACTG    2520
GTCTAAAAAG TAGTCTTCTT CTCGGAACGA AGATAATAA CACTATTTCA GCAGAAGTAG    2580
ATAGTCTCTT GGCTTTGTTA AAAGAAAGTC AACCGGCTCC TATACAGTAG TAAAATGAA    2639
(SEQ ID NO : 5)
FIGURE 5
```

```
MKFSKKYIAA GSAVIVSLSL CAYALNQHRS QENKDNNRVS YVDGSQSSQK     50
SENLTPDQVS QKEGIQAEQI VIKITDQGYV TSHGDHYHYY NGKVPYDALF    100
SEELLMKDPN YQLKDADIVN EVKGGYIIKV DGKYYVYLKD AAHADNVRTK    150
DEINRQKQEH VKDNEKVNSN VAVARSQGRY TTNDGYVFNP ADIIEDTGNA    200
YIVPHGGHYH YIPKSDLSAS ELAAAKAHLA GKNMQPSQLS YSSTASDNNT    250
QSVAKGSTSK PANKSENLQS LLKELYDSPS AQRYSESDGL VFDPAKIISR    300
TPNGVAIPHG DHYHFIPYSK LSALEEKIAR MVPISGTGST VSTNAKPNEV    350
VSSLGSLSSN PSSLTTSKEL SSASDGYIFN PKDIVEETAT AYIVRHGDHF    400
HYIPKSNQIG QPTLPNNSLA TPSPSLPINP GTSHEKHEED GYGFDANRII    450
AEDESGFVMS HGDHNHYFFK KDLTEEQIKA AQKHLEEVKT SHNGLDSLSS    500
HEQDYPGNAK EMKDLDKKIE EKIAGIMKQY GVKRESIVVN KEKNAIIYPH    550
GDHHHADPID EHKPVGIGHS HSNYELFKPE EGVAKKEGNK VYTGEELTNV    600
VNLLKNSTFN NQNFTLANGQ KRVSFSFPPE LEKKLGINML VKLITPDGKV    650
LEKVSGKVFC EGVGNIANFE LDQPYLPGQT FKYTIASKDY PEVSYDGTFT    700
VPTSLAYKMA SQTIFYPFHA GDTYLRVNPQ FAVPKGTDAL VRVFDEFHGN    750
AYLENNYKVG EIKLPIPKLN QGTTRTAGNK IPVTFMANAY LDNQSTYIVE    800
VPILEKENQT DKPSILPQFK RNKAQENSKL DEKVEEPKTS EKVEKEKLSE    850
TGNSTSNSTL EEVPTVDPVQ EKVAKFAESY GMKLENVLFN MDGTIELYLP    900
SGEVIKKNMA DFTGEAPQGN GENKPSENGK VSTGTVENQP TENKPADSLP    950
EAPNEKPVKP ENSTDNGMLN PEGNVGSDPM LDPALEEAPA VDPVQEKLEK   1000
FTASYGLGLD SVIFNMDGTI ELRLPSGEVI KKNLSDFIA (SEQ ID NO: 6)  1039
FIGURE 6
```

```
MKINKKYLAG SVATLVLSVC AYELGLHQAQ TVKENNRVSY IDGKQATQKT     50
ENLTPDEVSK REGINAEQIV IKITDQGYVT SHGDHYHYYN GKVPYDAIIS    100
EELLMKDPNY QLKDSDIVNE IKGGYVIKVN GKYYVYLKDA AHADNVRTKE    150
EINRQKQEHS QHREGGTSAN DGAVAFARSQ GRYTTDDGYI FNASDIIEDT    200
GDAYIVPHGD HYHYIPKNEL SASELAAAEA FLSGRENLSN LRTYRRQNSD    250
```

```
      NTPRTNWVPS VSNPGTTNTN TSNNSNTNSQ ASQSNDIDSL LKQLYKLPLS      300
      QRHVESDGLI FDPAQITSRT ARGVAVPHGN HYHFIPYEQM SELEKRIARI      350
      IPLRYRSNHW VPDSRPEEPS PQPTPEPSPS PQPAPNPQPA PSNPIDEKLV      400
      KEAVRKVGDG YVFEENGVSR YIPAKNLSAE TAAGIDSKLA KQESLSHKLG      450
 5    AKKTDLPSSD REFYNKAYDL LARIHQDLLD NKGRQVDFEA LDNLLERLKD      500
      VSSDKVKLVD DILAFLAPIR HPERLGKPNA QITYTDDEIQ VAKLAGKYTT      550
      EDGYIFDPRD ITSDEGDAYV TPHMTHSHWI KKDSLSEAER AAAQAYAKEK      600
      GLTPPSTDHQ DSGNTEAKGA EAIYNRVKAA KKVPLDRMPY NLQYTVEVKN      650
      GSLIIPHYDH YHNIKFEWFD EGLYEAPKGY TLEDLLATVK YYVEHPNERP      700
 10   HSDNGFGNAS DHVQRNKNGQ ADTNQTEKPS EEKPQTEKPE EETPREEKPQ      750
      SEKPESPKPT EEPEEESPEE SEEPQVETEK VEEKLREAED LLGKIQDPII      800
      KSNAKETLTG LKNNLLFGTQ DNNTIMAEAE KLLALLKESK (SEQ ID NO: 7)  840
      FIGURE 7
```

15

```
      MKINKKYLAG SVAVLALSVC SYELGRHQAG QVKKESNRVS YIDGDQAGQK       50
      AENLTPDEVS KREGINAEQI VIKITDQGYV TSHGDHYHYY NGKVPYDAII      100
      SEELLMKDPN YQLKDSDIVN EIKGGYVIKV DGKYVYLKD AAHADNIRTK       150
      EEIKRQKQEH SHNHNSRADN AVAAARAQGR YTTDDGYIFN ASDIIEDTGD      200
 20   AYIVPHGDHY HYIPKNELSA SELAAAEAYW NGKQGSRPSS SSSYNANPVQ      250
      PRLSENHNLT VTPTYHQNQG ENISSLLREL YAKPLSERHV ESDGLIFDPA      300
      QITSRTARGV AVPHGNHYHF IPYEQMSELE KRIARIIPLR YRSNHWVPDS      350
      RPEQPSPQST PEPSPSLQPA PNPQPAPSNP IDEKLVKEAV RKVGDGYVFE      400
      ENGVSRYIPA KDLSAETAAG IDSKLAKQES LSHKLGAKKT DLPSSDREFY      450
 25   NKAYDLLARI HQDLLDNKGR QVDFEVLDNL LERLKDVSSD KVKLVDDILA      500
      FLAPIRHPER LGKPNAQITY TDDEIQVAKL AGKYTTEDGY IFDPRDITSD      550
      EGDAYVTPHM THSHWIKKDS LSEAERAAAQ AYAKEKGLTP PSTDHQDSGN      600
      TEAKGAEAIY NRVKAAKKVP LDRMPYNLQY TVEVKNGSLI IPHYDHYHNI      650
      KFEWFDEGLY EAPKGYSLED LLATVKYYVE HPNERPHSDN GFGNASDHVR      700
 30   KNKADQDSKP DEDKEHDEVS EPTHPESDEK ENHAGLNPSA DNLYKPSTDT      750
      EETEEEAEDT TDEAEIPQVE NSVINAKIAD AEALLEKVTD PSIRQNAMET      800
      LTGLKSSLLL GTKDNNTISA EVDSLLALLK ESQPAPIQ                  838
      (SEQ ID NO : 8)
      FIGURE 8
```

35

```
      TGTGCCTATG CACTAAACCA GCATCGTTCG CAGGAAAATA AGGACAATAA TCGTGTCTCT    60
      TATGTGGATG GCAGCCAGTC AAGTCAGAAA AGTGAAAACT TGACACCAGA CCAGGTTAGC   120
      CAGAAAGAAG GAATTCAGGC TGAGCAAATT GTAATCAAAA TTACAGATCA GGGCTATGTA   180
 40   ACGTCACACG GTGATCACTA TCATTACTAT AATGGGAAAG TTCCTTATGA TGCCCTCTTT   240
      AGTGAAGAAC TCTTGATGAA GGATCCAAAC TATCAACTTA AAGACGCTGA TATTGTCAAT   300
      GAAGTCAAGG GTGGTTATAT CATCAAGGTC GATGGAAAAT ATTATGTCTA CCTGAAAGAT   360
      GCAGCTCATG CTGATAATGT TCGAACTAAA GATGAAATCA ATCGTCAAAA ACAAGAACAT   420
      GTCAAAGATA ATGAGAAGGT TAACTCTAAT GTTGCTGTAG CAAGGTCTCA GGGACGATAT   480
 45   ACGACAAATG ATGGTTATGT CTTTAATCCA GCTGATATTA TCGAAGATAC GGGTAATGCT   540
```

```
TATATCGTTC CTCATGGAGG TCACTATCAC TACATTCCCA AAAGCGATTT ATCTGCTAGT        600
GAATTAGCAG CAGCTAAAGC ACATCTGGCT GGAAAAAATA TGCAACCGAG TCAGTTAAGC        660
TATTCTTCAA CACCTTCTCC ATCTCTTCCA ATCAATCCAG GAACTTCACA TGAGAAACAT        720
GAAGAAGATG GATACGGATT TGATGCTAAT CGTATTATCG CTGAAGATGA ATCAGGTTTT        780
GTCATGAGTC ACGGAGACCA CAATCATTAT TTCTTCAAGA AGGACTTGAC AGAAGAGCAA        840
ATTAAGGCTG CGCAAAAACA TTTAGAGGAA GTTAAAACTA GTCATAATGG ATTAGATTCT        900
TTGTCATCTC ATGAACAGGA TTATCCAAGT AATGCCAAAG AAATGAAAGA TTTAGATAAA        960
AAAATCGAAG AAAAAATTGC TGGCATTATG AAACAATATG GTGTCAAACG TGAAAGTATT       1020
GTCGTGAATA AGAAAAAAA TGCGATTATT TATCCGCATG GAGATCACCA TCATGCAGAT       1080
CCGATTGATG AACATAAACC GGTTGGAATT GGTCATTCTC ACAGTAACTA TGAACTGTTT       1140
AAACCCGAAG AAGGAGTTGC TAAAAAAGAA GGGAATAAAG TTTATACTGG AGAAGAATTA       1200
ACGAATGTTG TTAATTTGTT AAAAAAATAGT ACGTTAATA ATCAAAACTT TACTCTAGCC       1260
AATGGTCAAA AACGCGTTTC TTTTAGTTTT CCGCCTGAAT TGGAGAAAAA ATTAGGTATC       1320
AAATATGCTAG TAAAATTAAT AACACCAGAT GGAAAAGTAT TGGAGAAAGT ATCTGGTAAA       1380
GTATTTGGAG AAGGAGTAGG GAATATTGCA AACTTTGAAT TAGATCAACC TTATTTACCA       1440
GGACAAACAT TTAAGTATAC TATCGCTTCA AAAGATTATC CAGAAGTAAG TTATGATGGT       1500
ACATTTACAG TTCCAACCTC TTTAGCTTAC AAAATGGCCA GTCAAACGAT TTTCTATCCT       1560
TTCCATGCAG GGGATACTTA TTTAAGAGTG AACCCTCAAT TTGCAGTGCC TAAAGGAACT       1620
GATGCTTTAG TCAGAGTGTT TGATGAATTT CATGGAAATG CTTATTTAGA AAATAACTAT       1680
AAAGTTGGTG AAATCAAATT ACCGATTCCG AAATTAAACC AAGGAACAAC CAGAACGGCC       1740
GGAAATAAAA TTCCTGTAAC CTTCATGGCA AATGCTTATT TGGACAATCA ATCGACTTAT       1800
ATTGTGGAAG TACCTATCTT GGAAAAAGAA AATCAAACTG ATAAACCAAG TATTCTACCA       1860
CAATTTAAAA GGAATAAAGC ACAAGAAAAC TCAAAACTTG ATGAAAAGGT AGAAGAACCA       1920
AAGACTAGTG AGAAGGTAGA AAAAGAAAAA CTTTCTGAAA CTGGGAATAG TACTAGTAAT       1980
TCAACGTTAG AAGAAGTTCC TACAGTGGAT CCTGTACAAG AAAAAGTAGC AAAATTTGCT       2040
GAAAGTTATG GGATGAAGCT AGAAAATGTC TTGTTTAATA TGGACGGAAC AATTGAATTA       2100
TATTTACCAT CGGGAGAAGT CATTAAAAAG AATATGGCAG ATTTTACAGG AGAAGCACCT       2160
CAAGGAAATG GTGAAAATAA ACCATCTGAA AATGGAAAAG TATCTACTGG AACAGTTGAG       2220
AACCAACCAA CAGAAAATAA ACCAGCAGAT TCTTTACCAG AGGCACCAAA CGAAAAACCT       2280
GTAAAACCAG AAAACTCAAC GGATAATGGA ATGTTGAATC CAGAAGGGAA TGTGGGGAGT       2340
GACCCTATGT TAGATTCAGC ATTAGAGGAA GCTCCAGCAG TAGATCCTGT ACAAGAAAAA       2400
TTAGAAAAAT TTACAGCTAG TTACGGATTA GGCTTAGATA GTGTTATATT CAATATGGAT       2460
GGAACGATTG AATTAAGATT GCCAAGTGGA GAAGTGATAA AAAGAATTT ATTGATCTCA        2520
TAGCGTAA    (SEQ ID NO : 9)                                            2528
FIGURE 9
```

```
CAYALNQHRS QENKDNNRVS YVDGSQSSQK SENLTPDQVS QKEGIQAEQI         50
VIKITDQGYV TSHGDHYHYY NGKVPYDALF SEELLMKDPN YQLKDADIVN        100
EVKGGYIIKV DGKYYVYLKD AAHADNVRTK DEINRQKQEH VKDNEKVNSN        150
VAVARSQGRY TTNDGYVFNP ADIIEDTGNA YIVPHGGHYH YIPKSDLSAS        200
ELAAAKAHLA GKNMQPSQLS YSSTPSPSLP INPGTSHEKH EEDGYGFDAN        250
RIIAEDESGF VMSHGDHNHY FFKKDLTEEQ IKAAQKHLEE VKTSHNGLDS        300
LSSHEQDYPS NAKEMKDLDK KIEEKIAGIM KQYGVKRESI VVNKEKNAII        350
YPHGDHHHAD PIDEHKPVGI GHSHSNYELF KPEEGVAKKE GNKVYTGEEL        400
```

```
        TNVVNLLKNS TFNNQNFTLA NGQKRVSPSF PPELEKKLGI NMLVKLITPD    450
        GKVLEKVSGK VFGEGVGNIA NFELDQPYLP GQTFKYTIAS KDYPEVSYDG    500
        TFTVPTSLAY KMASQTIFYP FHAGDTYLRV NPQFAVPKGT DALVRVFDEF    550
        HGNAYLENNY KVGEIKLPIP KLNQGTTRTA GNKIPVTFMA NAYLDNQSTY    600
    5   IVEVPILEKE NQTDKPSILP QFKRNKAQEN SKLDEKVEEP KTSEKVEKEK    650
        LSETGNSTSN STLEEVPTVD PVQEKVAKFA ESYGMKLENV LFNMDGTIEL    700
        YLPSGEVIKK NMADPTGEAP QGNGENKPSE NGKVSTGTVE NQPTENKPAD    750
        SLPEAPNEKP VKPENSTDNG MLNPEGNVGS DPMLDSALEE APAVDPVQEK    800
        LEKFTASYGL GLDSVIFNMD GTIELRLPSG EVIKKNLLIS              840
   10   (SEQ ID NO : 10)
        FIGURE 10



   15   DQGYVTSHGD HYHYYNGKVP YDALFSEELL MKDPNYQLKD ADIVNEVKGG YIIKVDGKYY
        VYLKDAAHAD NVRTKDEINR QKQEHVKDNE KVNS
        (SEQ ID NO: 11)
        FIGURE 11


   20   GIQAEQIVIK ITDQGYVTSH GDHYHYYNGK VPYDALFSEE LL
        (SEQ ID NO: 12)
        FIGURE 12


        TAYIVRHGDH FHYIPKSNQI GQPTLPNNSL ATPSPSLPI
   25   (SEQ ID NO: 13)
        FIGURE 13



        TSNSTLEEVP TVDPVQEKVA KFAESYGMKL ENVLFN
   30   (SEQ ID NO: 14)
        FIGURE 14



        MDGTIELRLP SGEVIKKNLS DFIA
   35   (SEQ ID NO: 15)
        FIGURE 15


        YGLGLDSVIF NMDGTIELRL PSGEVIKKNL SDFIA
        (SEQ ID NO: 16)
   40   FIGURE 16


        PALEEAPAVD PVQEKLEKFT ASYGLGLDSV IFNMDGTIEL RLPSGEVIKK NLSDFIA
        (SEQ ID NO: 17)
        FIGURE 17

   45
```

KVEEPKTSEK VEKEKLSETG NSTSNSTLEE VPTVDPVQEK

(SEQ ID NO: 18)

FIGURE 18

MKDLDKKIEE KIAGIMKQYG VKRESIVVNK EKNAIIYPHG DHHHADPIDE HKPVGIGHSH
SNYELFKPEE GVAKKEGN

(SEQ ID NO: 19)

FIGURE19

AIIYPHGDHH HADPIDEHKP VGIGHSHSNY ELFKPEEGVA KKEGNKVYTG E

(SEQ ID NO: 20)

FIGURE 20

IQVAKLAGKY TTEDGYIFDP RDITSDEGD

(SEQ ID NO: 21)

FIGURE 21

DHQDSGNTEA KGAEAIYNRV KAAKKVPLDR MPYNLQYTVE VKNGSLIIPH YDHYHNIKFE
WFDEGLYEAP KGYSLEDLLA TVKYYV

(SEQ ID NO: 22)

FIGURE 22

GLYEAPKGYS LEDLLATVKY YVEHPNERPH SDNGFGNASD H

(SEQ ID NO: 23)

FIGURE 23

GLYEAPKGYSLEDLLATVKYYV

(SEQ ID NO: 163)

Figure 24

LBVH-3AD

BVH+3

BVH-3C

BVH-3AD

NEW 15

7G11.7

4D4.9

BVH-3M

NEW 22

NEW 25

7G11.9

NEW 23

NEW 21

B12D8.2

NEW 2

NEW 1

7F4.1

BVH-38

NEW 3

14F6.3

4D3.4

10C12.7

8E3.1

1G2.2

1   194 322   514   678   1,172   1,340   1,530   1,772   2,400   2,564   3,120
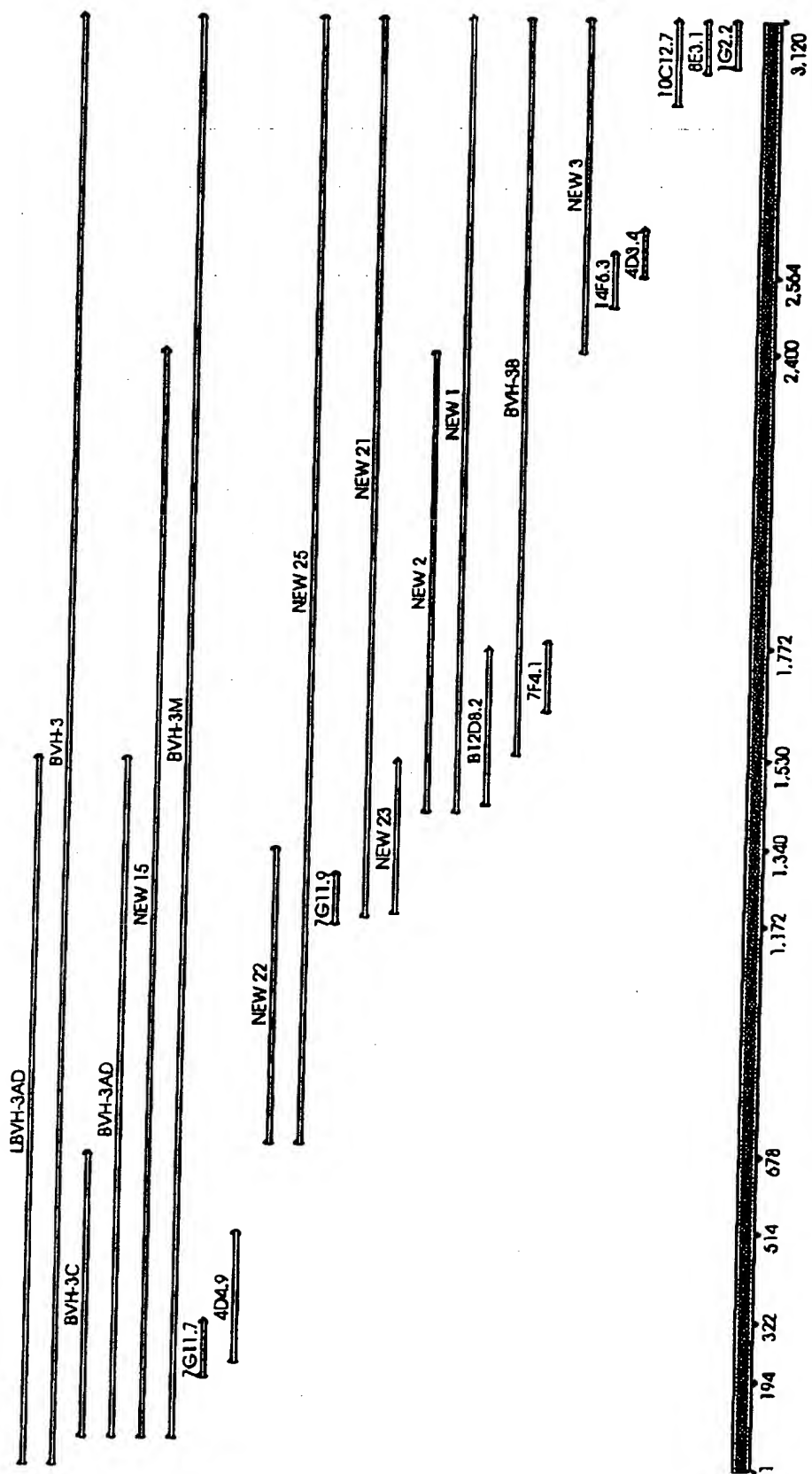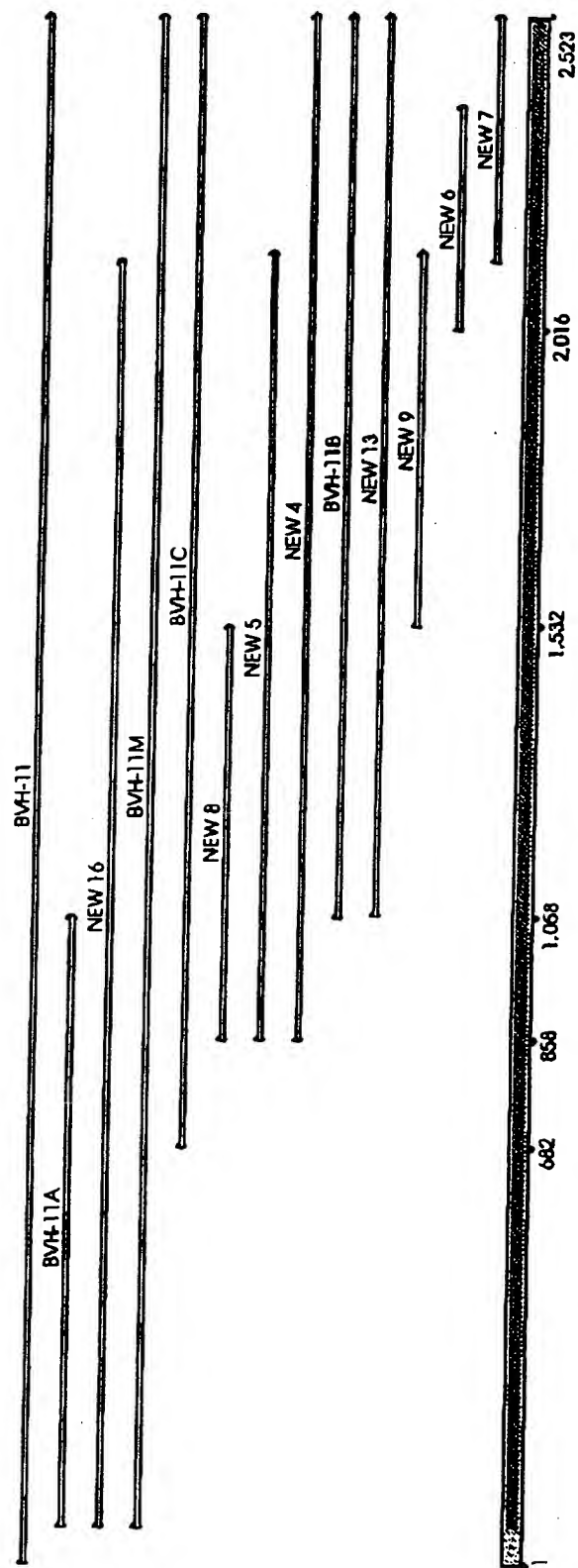
5   FIGURE 25
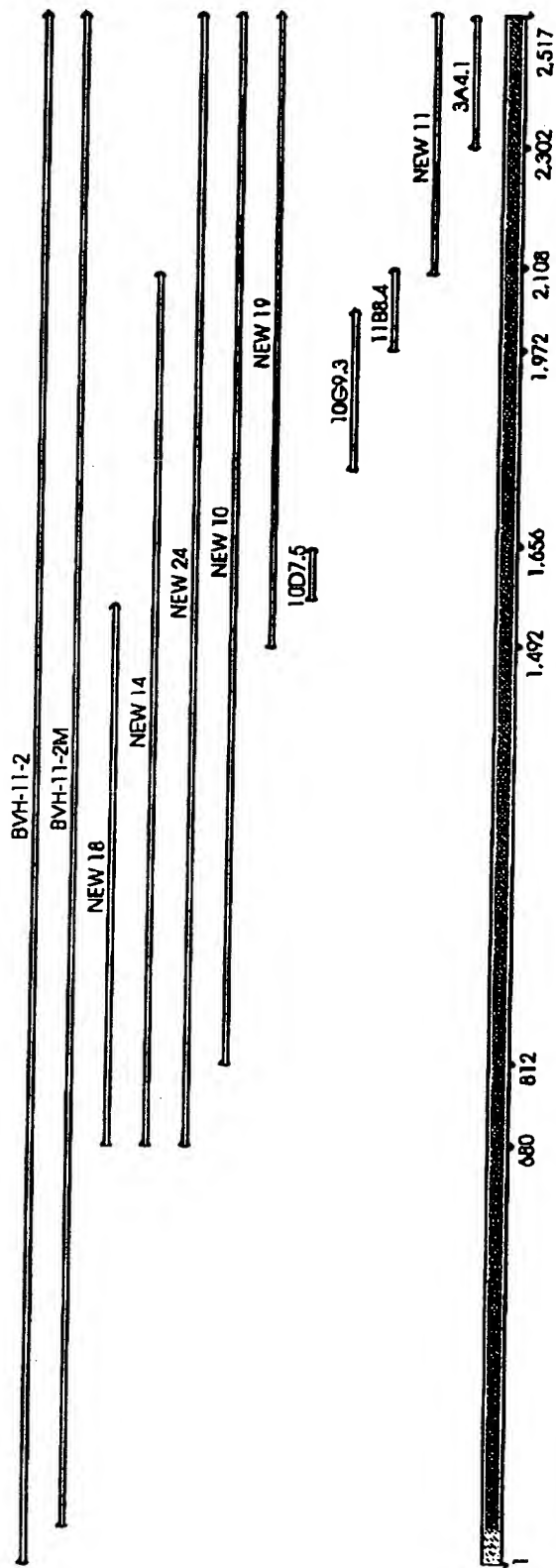
FIGURE 26

FIGURE 27

Epitope Localization on BVH-3 Protein
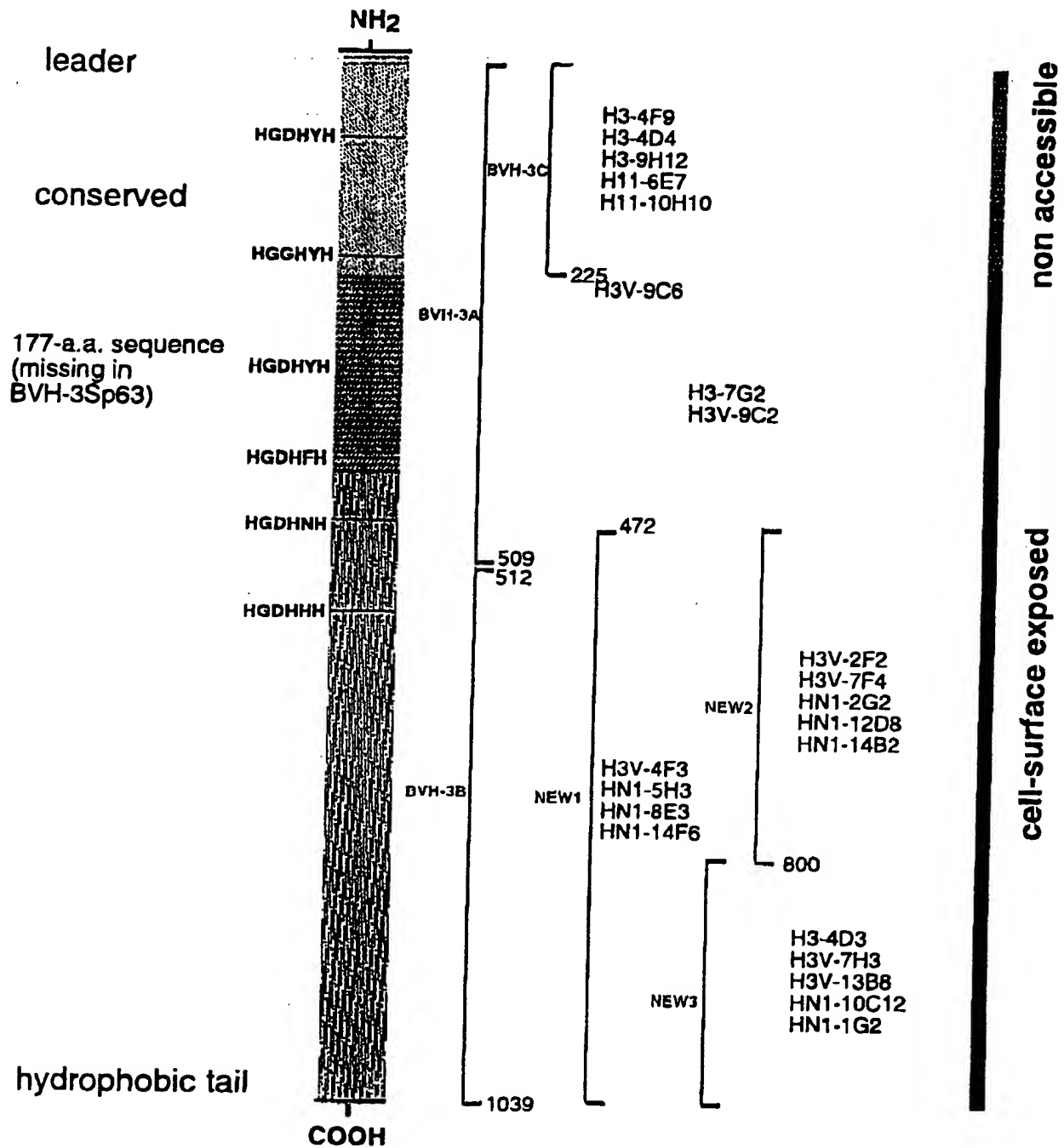
FIGURE 28

Epitope Localization on BVH-11-2 Prot in

leader

conserved

proline
rich (12 P/30

charged
BVH-11-2-specific

HGDHYH

HGDHYH

HGNHYH

HMTHSH

HYDHYH

NH2

PAPIQ-COOH

BVH-11A

NEW10

BVH-3C

H11-7G11
H11-

H112-2H7
H112-

271

H112-3A1
H11B-15G2
H11-10B8

H112-10D7 *
H11B-7E11   520
H11B-

NEW18

NEW19

NEW11

497

H112-10G9 *
H112-10A2 *
H11B-11B8 *
H112-3E8

699

H112-3A4

838

no
n
ac
ce
ssi
ble

cel
l-
su
rfa
ce
ex
po
se
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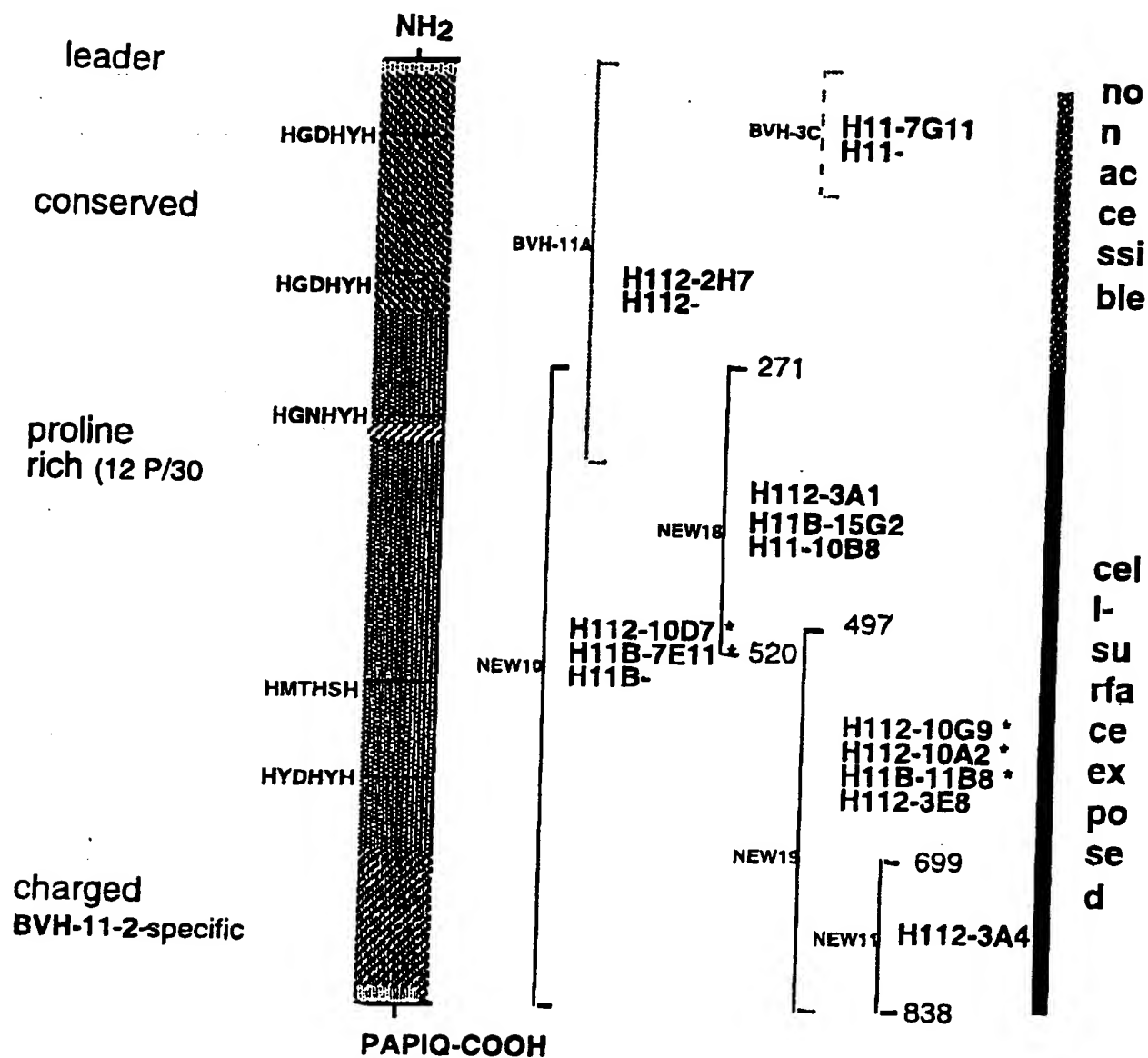
* Surface-exposed and protection-conferring Mabs

FIGURE 29

Kan^r

cl857

lambda pL

BglII

His-tag

EcoRV

Xbal

BamHI

terminator

pURY22.His
4925pb

ori
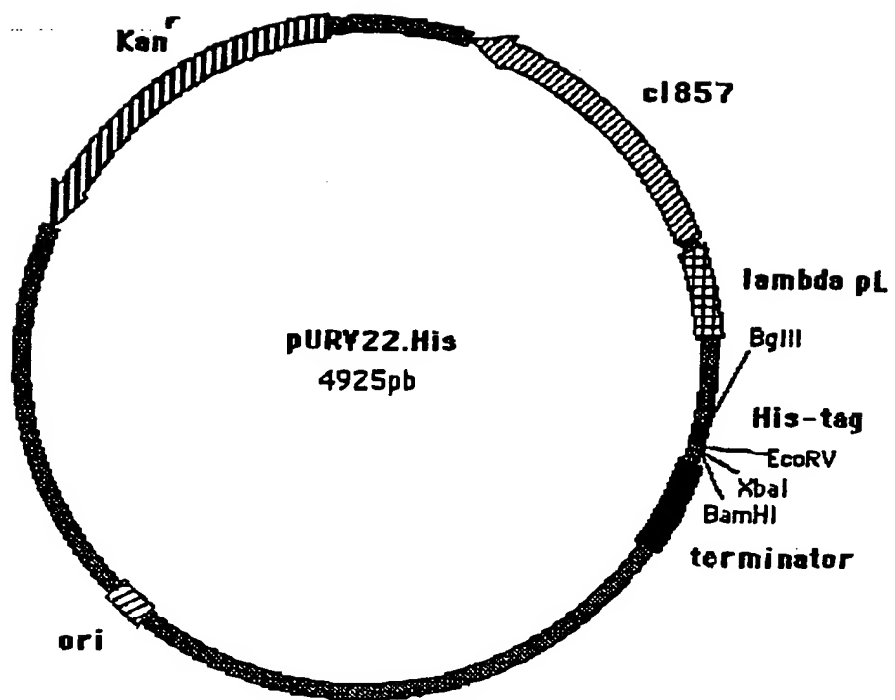
FIGURE 30

```
BVH-3M     1 CAYALNQHRSQENKDNNRVSYVDGSQSSQKSENLTPDQVSQKEGIQAEQIVIKITDQGYV   60
BVH3-63    1 CAYALNQHRSQENKDNNRVSYVDGSQSSQKSENLTPDQVSQKEGIQAEQIVIKITDQGYV   60
             ***********************************************************

BVH-3M    61 TSHGDHYHYYNGKVPYDALFSEELLMKDPNYQLKDADIVNEVKGGYIIKVDGKYYVYLKD  120
BVH3-63   61 TSHGDHYHYYNGKVPYDALFSEELLMKDPNYQLKDADIVNEVKGGYIIKVDGKYYVYLKD  120
             ***********************************************************

BVH-3M   121 AAHADNVRTKDEINRQKQEHVKDNEKVNSNVAVARSQGRYTTNDGYVFNPADIIEDTGNA  180
BVH3-63  121 AAHADNVRTKDEINRQKQEHVKDNEKVNSNVAVARSQGRYTTNDGYVFNPADIIEDTGNA  180
             ***********************************************************

BVH-3M   181 YIVPHGGHYHYIPKSDLSASELAAAKAHLAGKNMQPSQLSYSSTASDNNTQSVAKGSTSK  240
BVH3-63  181 YIVPHGGHYHYIPKSDLSASELAAAKAHLAGKNMQPSQLSYSS----------------  223
             ******************************************

BVH-3M   241 PANKSENLQSLLKELYDSPSAQRYSESDGLVFDPAKIISRTPNGVAIPHGDHYHFIPYSK  300
BVH3-63  224 ----------------------------------------------------------  223


BVH-3M   301 LSALEEKIARMVPISGTGSTVSTNAKPNEVVSSLGSLSSNPSSLTTSKELSSASDGYIFN  360
BVH3-63  224 ----------------------------------------------------------  223


BVH-3M   361 PKDIVEETATAYIVRHGDHFHYIPKSNQIGQPTLPNNSLATPSPSLPINPGTSHEKHEED  420
BVH3-63  224 ---------------------------------------TPSPSLPINPGTSHEKHEED  243
                                                    ********************

BVH-3M   421 GYGFDANRIIAEDESGFVMSHGDHNHYFFKKDLTEEQIKAAQKHLEEVKTSHNGLDSLSS  480
BVH3-63  244 GYGFDANRIIAEDESGFVMSHGDHNHYFFKKDLTEEQIKAAQKHLEEVKTSHNGLDSLSS  303
             ***********************************************************

BVH-3M   481 HEQDYPGNAKEMKDLDKKIEEKIAGIMKQYGVKRESIVVNKEKNAIIYPHGDHHHADPID  540
BVH3-63  304 HEQDYPSNAKEMKDLDKKIEEKIAGIMKQYGVKRESIVVNKEKNAIIYPHGDHHHADPID  363
             ******  ***************************************************

BVH-3M   541 EHKPVGIGHSHSNYELFKPEEGVAKKEGNKVYTGEELTNVVNLLKNSTFNNQNFTLANGQ  600
BVH3-63  364 EHKPVGIGHSHSNYELFKPEEGVAKKEGNKVYTGEELTNVVNLLKNSTFNNQNFTLANGQ  423
             ***********************************************************

BVH-3M   601 KRVSFSFPPELEKKLGINMLVKLITPDGKVLEKVSGKVFGEGVGNIANFELDQPYLPGQT  660
BVH3-63  424 KRVSFSFPPELEKKLGINMLVKLITPDGKVLEKVSGKVFGEGVGNIANFELDQPYLPGQT  483
```

```
                    *******************************************************
      BVH-3M    661 FKYTIASKDYPEVSYDGTFTVPTSLAYKMASQTIFYPFHAGDTYLRVNPQFAVPKGTDAL  720
      BVH3-63   484 FKYTIASKDYPEVSYDGTFTVPTSLAYKMASQTIFYPFHAGDTYLRVNPQFAVPKGTDAL  543
  5                 *******************************************************
```

```
      BVH-3M    721 VRVFDEFHGNAYLENNYKVGEIKLPIPKLNQGTTRTAGNKIPVTFMANAYLDNQSTYIVE  780
      BVH3-63   544 VRVFDEFHGNAYLENNYKVGEIKLPIPKLNQGTTRTAGNKIPVTFMANAYLDNQSTYIVE  603
 10                 *******************************************************
```

```
      BVH-3M    781 VPILEKENQTDKPSILPQFKRNKAQENSKLDEKVEEPKTSEKVEKEKLSETGNSTSNSTL  840
      BVH3-63   604 VPILEKENQTDKPSILPQFKRNKAQENSKLDEKVEEPKTSEKVEKEKLSETGNSTSNSTL  663
                    *******************************************************
```

```
 15   BVH-3M    841 EEVPTVDPVQEKVAKFAESYGMKLENVLFNMDGTIELYLPSGEVIKKNMADFTGEAPQGN  900
      BVH3-63   664 EEVPTVDPVQEKVAKFAESYGMKLENVLFNMDGTIELYLPSGEVIKKNMADFTGEAPQGN  723
                    *******************************************************
```

```
      BVH-3M    901 GENKPSENGKVSTGTVENQPTENKPADSLPEAPNEKPVKPENSTDNGMLNPEGNVGSDPM  960
 20   BVH3-63   724 GENKPSENGKVSTGTVENQPTENKPADSLPEAPNEKPVKPENSTDNGMLNPEGNVGSDPM  783
                    *******************************************************
```

```
      BVH-3M    961 LDPALEEAPAVDPVQEKLEKFTASYGLGLDSVIFNMDGTIELRLPSGEVIKKNLSDFIA  1019
      BVH3-63   784 LDSALEEAPAVDPVQEKLEKFTASYGLGLDSVIFNMDGTIELRLPSGEVIKKNLLIS    840
 25                 ** *****************************************************
```

FIGURE 31

```
 30

      BVH-3      1 MKFSKKYIAAGSAVIVSLSLCAYALNQHRSQENK-DNNRVSYVDGSQSSQKSENLTPDQV  59
      BVH-11     1 MKINKKYLAG-SVATLVLSVCAYELGLHQAQTVK-ENNRVSYIDGKQATQKTENLTPDEV  58
      BVH-11-2   1 MKINKKYLAG-SVAVLALSVCSYELGRHQAGQVKKESNRVSYIDGDQAGQKAENLTPDEV  59
 35            ** *** . * *   . **.*.* *. *..  *  . ***** ** * . ** .****** .*
```

```
      BVH-3     60 SQKEGIQAEQIVIKITDQGYVTSHGDHYHYYNGKVPYDALFSEELLMKDPNYQLKDADIV  119
      BVH-11    59 SKREGINAEQIVIKITDQGYVTSHGDHYHYYNGKVPYDAIISEELLMKDPNYQLKDSDIV  118
      BVH-11-2  60 SKREGINAEQIVIKITDQGYVTSHGDHYHYYNGKVPYDAIISEELLMKDPNYQLKDSDIV  119
 40            *..***.************************************. ************.***
```

```
      BVH-3    120 NEVKGGYIIKVDGKYYVYLKDAAHADNVRTKDEINRQKQEHVKDNE----KVNSNVAVAR  175
      BVH-11   119 NEIKGGYVIKVNGKYYVYLKDAAHADNVRTKEEINRQKQEHSQHREGGTSANDGAVAFAR  178
      BVH-11-2 120 NEIKGGYVIKVDGKYYVYLKDAAHADNIRTKEEIKRQKQEHSHNHN---SRADNAVAAAR  176
 45            **.****.*** *****************.*** ** ******  .        ** **
```

```
BVH-3      176 SQGRYTTNDGYVFNPADIIEDTGNAYIVPHGGHYHYIPKSDLSASELAAAKAHLAGKNMQ   235
BVH-11     179 SQGRYTTDDGYIFNASDIIEDTGDAYIVPHGDHYHYIPKNELSASELAAAEAFLSGRENL   238
BVH-11-2   177 AQGRYTTDDGYIFNASDIIEDTGDAYIVPHGDHYHYIPKNELSASELAAAEAYWNGKQ--   234
               .****** ***.** .******* ****** ******  .******** *   *.


BVH-3      236 PSQLSYSSTASDNNTQSVAKGSTSKP------A-N---------KSENLQSLLKELYDSP   279
BVH-11     239 SNLRTYRRQNSDNTPRTNWVPSVSNPGTTNTNTSNNSNTNSQASQSNDIDSLLKQLYKLP   298
BVH-11-2   235 -GSRPSSSSSYNANPVQPRLSENHNLTVTPTYHQN--------QGENISSLLRELYAKP   284
                                          *            .  . ***..** *


BVH-3      280 SAQRYSESDGLVFDPAKIISRTPNGVAIPHGDHYHFIPYSKLSALEEKIARMVPISGTGS   339
BVH-11     299 LSQRHVESDGLIFDPAQITSRTARGVAVPHGNHYHFIPYEQMSELEKRIARIIPLRYRSN   358
BVH-11-2   285 LSERHVESDGLIFDPAQITSRTARGVAVPHGNHYHFIPYEQMSELEKRIARIIPLRYRSN   344
               ..* *****.****.* *** ***.*** ******  ..* ** .***..*.


BVH-3      340 TVSTNAKPNEVVSSLGSLSSNPSSLTTSKELSSASDGYIFNPKDIVEETATAYIVRHGDH   399
BVH-11     359 HWVPDSRP-EEPSPQPTPEPSPS-PQPAPNPQPAPS----NP--IDEKLVKEAVRKVGDG   410
BVH-11-2   345 HWVPDSRP-EQPSPQSTPEPSPS-LQPAPNPQPAPS----NP--IDEKLVKEAVRKVGDG   396
               ..* * *      **    .    *    ** * *      . . **


BVH-3      400 FHYIPKSNQIGQPTLPNNSLATPSPSLPINPGTSHEKHEEDGYGFDANRIIAEDESGFVM   459
BVH-11     411 YVFEE-----------NGVSRYIP--------AKNLSAETAAGIDSKLAKQESLS----   446
BVH-11-2   397 YVFEE-----------NGVSRYIP--------AKDLSAETAAGIDSKLAKQESLS----   432
               . .          *  .. *          .. * * *.       * *


BVH-3      460 SHGDHNHYFFKKDLTEEQIKAAQKHLEEVKTSHNGLDSLSSHEQDYPGNAKEMKDLDKKI   519
BVH-11     447 ----HKLGAKKTDLPSSDREFYNKAYDLLARIHQDLLDNKGRQVDFEALDNLLERLKDVS   502
BVH-11-2   433 ----HKLGAKKTDLPSSDREFYNKAYDLLARIHQDLLDNKGRQVDFEVLDNLLERLKDVS   488
                   *        * **      .*  ..  *. *    .. *.      .      *


BVH-3      520 EEKIAGIMKQYGVKRESIVVNKEKNAIIYPHGDHHHADPIDEHKPVGIGHSHSNYELFKP   579
BVH-11     503 SDKVKLVDDILAFLAP--IRHPER--LGKPNAQITYTDDEIQVAKLAGKYTTEDGYIFDP   558
BVH-11-2   489 SDKVKLVDDILAFLAP--IRHPER--LGKPNAQITYTDDEIQVAKLAGKYTTEDGYIFDP   544
                .*.         .  .    *.   . .      * .   * .          .* *


BVH-3      580 EEGVAKKEGNKVYTGEELTNVVNLLKNSTFNNQNPTLANGQKRVSFSFPPELEKKLGINM   639
BVH-11     559 RD-ITSDEGD-AYVTPHMTHSHWIKKDS-LSEAERAAAQAYAKEKGLTPPSTDHQD----   611
BVH-11-2   545 RD-ITSDEGD-AYVTPHMTHSHWIKKDS-LSEAERAAAQAYAKEKGLTPPSTDHQD----   597
                . .. ** * * .* . * * *     *.       *.       **  ...


BVH-3      640 LVKLITPDGKVLEKVSGKVFGEGVGNIANFELDQPYLPGQTFKYTIASKDYPEVSYDGTF   699
BVH-11     612 ---------------SGNTEAKGAEAIYNRVKAAKKVPLDRMPYNLQ---YTVEVKNGSL   653
BVH-11-2   598 ---------------SGNTEAKGAEAIYNRVKAAKKVPLDRMPYNLQ---YTVEVKNGSL   639
                   ** * * *       .* . *.  *       *
```

```
BVH-3     700 TVPTSLAYKMASQTIFYPFHAGDTYLRVNPQFAVPKGTDALVRVFDEFHGNAYLENNYKV 759
BVH-11    654 IIP---HYDHYHNIKFEWFDEG-------LYEAPKG--------------YTLEDLLAT 688
BVH-11-2  640 IIP---HYDHYHNIKFEWFDEG-------LYEAPKG--------------YSLEDLLAT 674
               .*    *    * * * *        . ***              **

BVH-3     760 GEIKLPIPKLNQGTTRTAGNKIPVTFMANAYLDNQSTYIVEVPILEKENQTDKPSILPQF 819
BVH-11    689 VKYYVEHPNERPHSDNGFGN-------ASDHVQRN-----------KNGQADTN------ 724
BVH-11-2  675 VKYYVEHPNERPHSDNGFGN-------ASDHVRKN-----------KADQDSKP------ 710
               .   *    .    ** *      .             *  *

BVH-3     820 KRNKAQENSKLDEKVEEPKTSEKVEKEKLSETGNSTSNSTLEEVPTVDPVQEKVAKPAES 879
BVH-11    725 ------QTEKPSEEKPQTEKPE---EE----------------------------------- 742
BVH-11-2  711 ------DEDKEHDEVSEPTHPESDEKE---------------------------------- 731
               *   .    .     *     *

BVH-3     880 YGMKLENVLFNMDGTIELYLPSGEVIKKNMADFTGEAPQGNGENKPSENGKVSTGTVENQ 939
BVH-11    743 --------------------------------TPREEKPQSE---KPES----------PK 758
BVH-11-2  732 --------------------------------NHAGLNPSADNLYKPSTD---------TE 751
                                              *        * *

BVH-3     940 PTENKPADSLPEAPNEKPVKPENSTDNGMLNPEGNVGSDPMLDPALEEAPAVDPVQEKLE 999
BVH-11    759 PTEEPEEESPEES--EEPQVETEKVEEKLREAEDLLGK--IQDPIIKSN-----AKETLT 809
BVH-11-2  752 ETEEEAEDTTDEA--EIPQVENSVINAKIADAEALLEK--VTDPSIRQN-----AMETLT 802
               * *    .. *. * *      .   *   .** .      * *

BVH-3    1000 KFTASYGLGLDSVIFNMDGTIELRLPSGEVIKKNLSDFIA 1039
BVH-11    810 GLKNNLLFGTQ-----DNNTIMAEAEKLLALLKESK     840
BVH-11-2  803 GLKSSLLLGTK-----DNNTISAEVDSLLALLKESQPAPIQ 838
               *         .**        . *
```

FIGURE 32

```
  1 ATGCAAATTA CCTACACTGA TGATGAGATT CAGGTAGCCA AGTTGGCAGG CAAGTACACA
 61 ACAGAAGACG GTTATATCTT TGATACTAGT TGGATTAAAA AAGATAGTTT GTCTGAAGCT
121 GAGAGAGCGG CAGCCCAGGC TTATGCTAAA GAGAAAGGTT TGACCCCTCC TTCGACAGAC
181 CACCAGGATT CAGGAAATAC TGAGGCAAAA GGAGCAGAAG CTATCTACAA CCGCGTGAAA
241 GCAGCTAAGA AGGTGCCACT TGATCGTATG CCTTACAATC TTCAGTATAC TGTAGAAGTC
301 AAAAACGGTA GTTTAATCAT ACCTCATTAT GACCATTACC ATAACATCAA ATTTGAGTGG
361 TTTGACGAAG GCCTTTATGA GGCACCTAAG GGGTATAGTC TTGAGGATCT TTTGGCGACT
421 GTCAAGTACT ATGTCGAACC GCGGAACGCT AGTGACCATG TTCGTAAAAA TAAGGCAGAC
481 CAAGATAGTA AACCTGATGA AGATAAGGAA CATGATGAAG TAAGTGAGCC AACTCACCCT
541 GAATCTGATG AAAAAGAGAA TCACGCTGGT TTAAATCCTT CAGCAGATAA TCTTTATAAA
601 CCAAGCACTG ATACGGAAGA GACAGAGGAA GAAGCTGAAG ATACCACAGA TGAGGCTGAA
661 ATTCCTGGTA CCCCTAGTAT TAGACAAAAT GCTATGGAGA CATTGACTGG TCTAAAAAGT
721 AGTCTTCTTC TCGGAACGAA AGATAATAAC ACTATTTCAG CAGAAGTAGA TAGTCTCTTG
781 GCTTTGTTAA AAGAAAGTCA ACCGGCTCCT ATACAGTAG   (SEQ ID NO: 257)
```

FIGURE 33

```
  1 MQITYTDDEI QVAKLAGKYT TEDGYIFDTS WIKKDSLSEA ERAAAQAYAK EKGLTPPSTD
 61 HQDSGNTEAK GAEAIYNRVK AAKKVPLDRM PYNLQYTVEV KNGSLIIPHY DHYHNIKFEW
121 FDEGLYEAPK GYSLEDLLAT VKYYVEPRNA SDHVRKNKAD QDSKPDEDKE HDEVSEPTHP
181 ESDEKENHAG LNPSADNLYK PSTDTEETEE EAEDTTDEAE IPGTPSIRQN AMETLTGLKS
241 SLLLGTKDNN TISAEVDSLL ALLKESQPAP IQ    (SEQ ID NO : 258)
```

FIGURE 34